# Semantic Web Technologies Research

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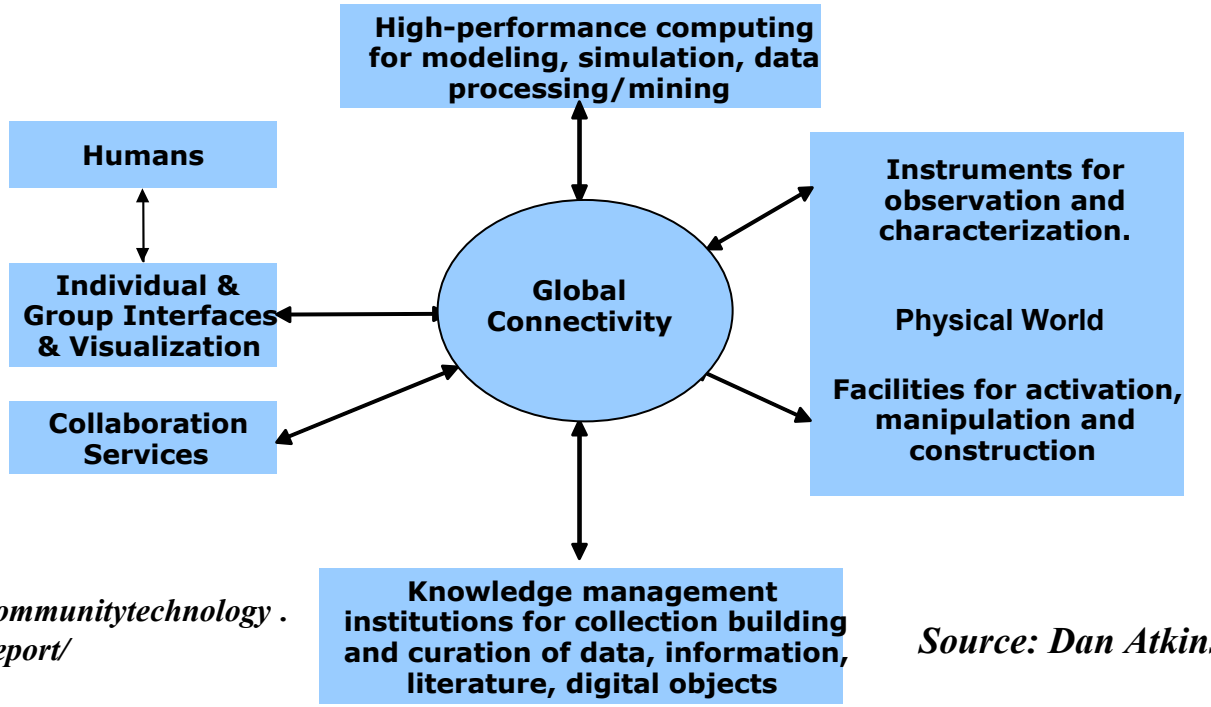
# Semantic Web Technologies Research

- Cyber-infrastructures
- Globus Toolkit – middleware product
- Middleware technologies for Grid Computing
- Agent-Enabled, Grid-Oriented Network of Expert agents (AEGONE)
- Agent-mediated Web-site
- Semantic Web Interest Group (SWIG)

# CYBER-INFRASTRUCTURE

## Components of Cyber-infrastructure

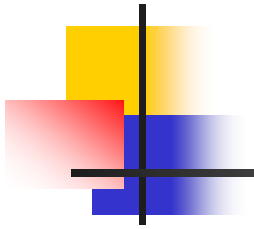



*http://www.communitytechnology . org/nsf_ci_report/*

***Source: Dan Atkins***

**Grid implies global (international) system for collaboration**

# The Globus Structure



**Applications**

EOS, GEOscience Network (GEON)
Mesoscale meteorology research,
Distributed data-intensive science,..

**Application Toolkits**

Remote computation, data grid, remote visualization, portals

**Grid Services & Middleware (*Research Focus*)**

Protocols, authentication, policy, resource management, workflow management, discovery, events..

**Grid fabric**

Computers, servers, network, etc. and their associated services

# Middleware Technologies for Grid Computing

- Work scheduling (Planning and scheduling)
- Security:  Authentication and Authorization
- Data management and analysis across sites and organizations
- Knowledge-intensive processing in multi-disciplinary large-scale science
- Storage management for robust, efficient file management, transfer and sharing
- Network management services

# Middleware Technologies (cont.)

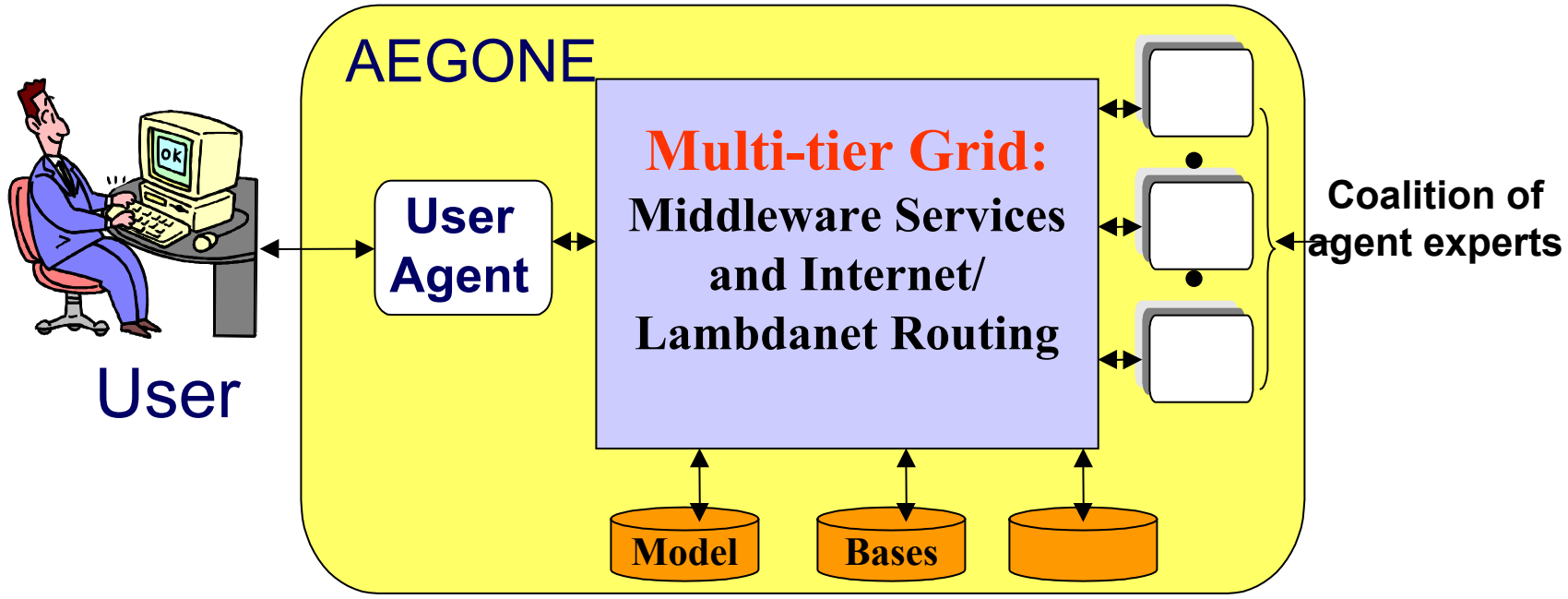
- Semantic Web to support:
  - Transparent document sharing
  - Metadata annotations
  - Semantic integration and ontologies

- Current Research Focus: Develop wrapper agents for each middleware technology to hide usage details from Grid users

# Agent-mediated Grid Computing

**Agent-Enabled, Grid-Oriented Network of Expert agents (AEGONE)**

## AEGONE Architecture



# Agent-mediated Web-site

- The purpose of this activity is to gain experience in the application of semantic-web and agent technologies in making web-site information more easily accessible and maintainable.
  - Initial prototype has been developed by Matt Bandt/Code 588 to start demonstrating concept.

# Agent-mediated Web-site (cont.)

- The initial prototype was developed by applying RDF and OWL to the Strategic Technology website in Code 588
  - Additional studies on this concept will be carried out by Dr. Karin Braitman from Brazil who will be visiting GSFC in February.

# Semantic Web Interest Group (SWIG)

- The SWIG was started about three years ago to provide interested individuals with an opportunity to become aware of state-of-the-art developments in semantic-web technologies.

# Semantic Web Interest Group SWIG (continued)

- Informal SWIG meetings will continue
- NASA HQs has started a NASA SWIG Group – GSFC is participating
- Work is proceeding on the development of a projects ontology which will allow uniform access to project database information (headed by Harry Frisch/Code531)
- Work is continuing on the development of a standard ontology for GSFC Library use. Code 588 participates in the Metadata group headed by Gail Hodge (Library)